LeROY CRANDALL AND ASSOCIATES consulting geotechnical engineers, 711 n. alvarado st., los angeles, ca. 90026, (213) 413-3550, telex 69-8375

M/R
2E-1

November 18, 1983

BKK Corporation
P.O. Box 3038
Torrance, California 90510

(Our Job No. E-83124-B)

Attention: Mr. Joseph R. Johnson, PE
Chief Engineer

Gentlemen:

U.S. Environmental Protection Agency
Warning Letter Dated October 21, 1983
BKK Landfill, West Covina, California

In accordance with your letter dated November 15, 1983, we have prepared answers to Item Nos. 4, 5, 6, 7 and 8 of the subject letter. We are responding in a comment/response format for purposes of clarity.

Item 4 Summary of all interim status groundwater monitoring.

RESPONSE: All available groundwater monitoring data has been presented in Appendix F of the Part B Application. The chemical analyses prepared during interim status for each monitoring well are summarized in Appendix 1 of Appendix F. The water level measurements at monitoring wells are summarized in Appendix 2 of Appendix F of the Part B Application. In addition, the fluctuations of ground water levels at selected monitoring wells are presented graphically on Figures 8 through 17 inclusive of Appendix F.

inadequate frequency
inadequate sampling
compounds

submit level measurement procedure
unusual variation in water levels

Variations in ground water conductivity for Monitoring Wells M-4A, M-5, M-6A, M-6B and M-9 are presented in graph form on Figures 20 and 21. Changes in chemical oxygen demand with time at Monitoring Wells M-4A, M-5, M-6 and M-6B are illustrated on Figure 22 of Appendix F.

Wq.

Item 5 Identification of uppermost aquifer.

RESPONSE: The uppermost aquifer present on the site has been described in Appendix F on Page F-33 as follows:

"Water occurs within the alluvium that occupies canyons incised into the Puente Formation. The alluvium is less than 50 feet thick in most areas. Groundwater recharge occurs from rainfall runoff into the ephemeral stream channels, and varies with storm intensity and frequency. Some recharge may also result from leachate migrating southwestward from the Class I disposal area. The shallow depth to bedrock observed within the channels suggests that the alluvial aquifers have a very limited storage capacity."

The extent of the alluvium (uppermost aquifer) within the property is shown on Plate 2, Hydrogeologic Map of Appendix F.

It is our understanding that the alluvium in the stream channels upgradient of Barrier 1 was removed during grading operations. Other geologic units which are potential conduits for fluids if saturated are the weathered zone of bedrock (Puente Formation) and the capricious occurrence of joint and fracture systems within the unweathered bedrock. The uppermost aquifers are also described in general terms in the first paragraph on Page F-53 of Appendix F.

Item 6 Description of any existing plume of contamination.

RESPONSE: Based on our knowledge of the available data, we find no evidence of the existence of a contaminated plume off-property. Chemical analyses of water wells in the alluvial aquifer located to the west of the property are presented on Table 12 of Appendix F of the BKK Part B Application. More recent data obtained from Suburban Water Systems from their active and inactive wells in the vicinity of the landfill, do not indicate the presence of contaminated water. The Suburban Water Systems data is attached to their letter to Frank Ford and Lynn Ford, dated October 27, 1983.

We are aware of the presence of small amounts of seepage water at the "Nogales Seep" area on property. Only a limited number of specific constituents were determined in the laboratory due to the small sample of fluid obtained. The sample had an above normal electrical conductance. However, the analysis alone is not necessarily indicative of leachate in the seepage water. Available data are presented on Table 12 of Appendix F. We are also aware of the presence of leachate in Monitoring Well M-4A, as shown in Appendix 1 of Appendix F of the Part B Application. This well is located immediately downgradient of Barrier 1. We are not sure of the origin of the leachate in Well M-4A at this time because of the leakage of fluids around the isolating seals in this multiple piezometer monitoring well.

The chemical analyses of water from downgradient monitoring wells M-5 and M-9 are less diagnostic (see Appendix 1 of Appendix F of the Part B Application). If leachate is present downgradient of Barrier 1, a question arises as to the source of the leachate. Is it from the Class I area, or is it from the Class II area? The problem is further complicated by the fact that tank trucks and other equipment were formerly washed out in the creek area between M-4A and M-9. This problem can hopefully be evaluated upon completion of the Site Characterization Studies requested by Department of Health Services. It should be noted that the questionable area is located on property.

Detailed studies are currently underway which will shortly provide a better understanding of the hydraulic barrier systems. It should also be noted that since Barrier 1 has been tested, equilibrium conditions have been reestablished by the continuous pumping of about 3 gallons per minute, or about 130,000 gallons per month. Records of monthly pumpage submitted to the Los Angeles Regional Water Quality Control Board since 1977 indicate the average monthly pumpage from Barrier 1 to be about 170,000 gallons per month. This suggests that there has been substantial control of leachate at Barrier 1.

Item 7 Detection monitoring program (if appropriate).

RESPONSE: Due to the fact that leachate has been identified in monitoring wells M-4A and possibly in M-5 and M-9, located downgradient from Barrier 1, a detection monitoring program is not appropriate (Sec. 40 CFR, Part 265, Subpart as amended January 11, 1982).

Item 8 Compliance monitoring program (if appropriate).

RESPONSE: A compliance monitoring program was recommended in Appendix F of the Part B Application commencing on Page F-43 and extending through Page F-53. A description is given of the constituents to be monitored, sampling and analysis procedures, sample custody, sample preservation, sample shipment, statistical comparison procedures and a discussion of a corrective action program.

Included as appendicies to this letter are copies of the several plans which have been submitted to the State Department of Health Services.

Appendix A, Downgradient Extraction Plan, dated October 12, 1983.

Appendix B, Site Characterization and Ground Water Monitoring Program, dated November 2, 1983.

Appendix C, Barrier and Liner Study Plan, dated November 2, 1983.

Appendix D, Liquid Management Plan, dated November 15, 1983.

We will appreciate receiving any comments on these responses at your convenience.

Yours very truly,

LeROY CRANDALL AND ASSOCIATES

by Glenn A Brown
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB-DLM/D50
Attachments
(8 copies submitted)

DOWNGRADIENT EXTRACTION PLAN
BKK WEST COVINA SANITARY LANDFILL

Prepared for
BKK Corporation
Torrance, California
October 12, 1983

By
LeRoy Crandall and Associates
Our Job No. E-83124-B

LeROY CRANDALL AND ASSOCIATES consulting geotechnical engineers, 711 n. alvarado st., los angeles, ca. 90026, (213) 413-3550, telex 69-8375

October 12, 1983

BKK Corporation
P.O. Box 3038
Torrance, California 90510

(Our Job No. E-83124-B)

Attention: Mr. Joseph R. Johnson
Chief Engineer

Gentlemen:

Subject: Downgradient Extraction Plan
BKK West Covina Landfill

Attached is our proposed Downgradient Extraction Plan for Barriers 1 and 2 at your West Covina Landfill. The following description of the plan includes a description of hydrogeologic conditions at the barriers, a brief summary of the recent testing of the barriers, a description of the proposed Downgradient Extraction Plan, and technical specifications for construction of the downgradient monitoring wells. Construction details of the existing barriers have been most recently described in Appendix F of the BKK "Operation Plan" which was submitted to the EPA on August 1, 1983, and are not included herein. Please advise us in the event details of our recommendations require any clarification.

Yours very truly,

LeROY CRANDALL AND ASSOCIATES

by
Donald L. McCann, R.G. 993
Principal Hydrogeologist

by
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB:DLM/D48
Attachment
(3 copies submitted)

CONTENTS

APPENDIX

PLATE

HYDROGEOLOGIC CONDITIONS

Hydrogeologic conditions in the vicinity of Leachate Control Barriers 1 and 2 have been described in numerous reports by Pacific Soils Engineering, Inc., which were briefly summarized in our Appendix F of the "Operation Plan" prepared by Lockman and Associates and submitted to the EPA in a two-volume report dated August 1, 1983.

A natural westerly trending alluvial filled channel has been formed downgradient from Barrier No 1 by the erosion of an essentially non-waterbearing Miocene shale bedrock. It has been subsequently backfilled by recent alluvial erosional debris from the surrounding San Jose Hills. The alluvium within the eroded channel consists of silty sand with some gravel that reaches a depth of 30 to 40 feet. It has a low to moderate permeability that is capable of transmitting ground water when it becomes saturated during those exceptional periods of above-normal rainfall. The underlying bedrock is comprised of marine sedimentary shales of the upper Miocene Puente Formation. The shales are essentially impermeable. They do not form an aquifer, but under some conditions may be capable of transmitting ground water, or leachate, through an enclosed system of joints and fractures. The transmission capacity of the joints and fractures is unknown; but recent testing of the pumping and monitoring wells associated with Barrier No. 1 indicate that it is probably rather limited. The fracture systems are probably in hydraulic continuity with the overlying alluvium, although water level measurements in monitoring wells indicate that liquids

within the joint and fracture systems are semi-confined. Liquid levels in monitoring wells near Barrier 1 that penetrate the alluvium, and underlying shales have varied considerably since 1976 with depths to liquid levels ranging from 10 to 70 feet.

Subsurface hydrogeologic conditions in the vicinity of Barrier 2 are generally similar to those near Barrier 1. However, the Barrier has been overlain by solid waste materials since it was constructed and depths to liquids in monitoring wells are somewhat greater than those in wells near Barrier 1.

HYDRAULIC TESTING OF BARRIERS

Each of the Barriers include a trench that has been excavated into the shale bedrock and backfilled with gravel to form a sump that has been positioned to intercept the lateral flow of migrating leachate. Two leachate extraction wells penetrate each trench or "gravel collector" which permits the pumping of any leachate that migrates from the active liquid waste disposal areas to the Barriers. The effectiveness of the extraction wells was tested during the past two months to determine the volume of leachate that could be removed from the alluvial and fracture systems and the effect of pumping on liquid levels in monitoring wells, upgradient and downgradient from the extraction wells. Detailed evaluations of Barrier testing have not been completed, but studies in progress provide sufficient information for the planning of downgradient extraction plans.

BARRIER NO. 1

Testing of Barrier No. 1 was conducted during early September. It included pumping of Extraction Well No. 8, and observing liquid level changes in associated monitoring wells. The program also included testing of multiple-piezometer observation wells downgradient from the Barrier to determine if isolating seals are effective.

Extraction Well No. 8 was pumped at rates ranging from 8 to 23 gpm for 24 hours. However, sustained pumping could only be maintained at about 10 gpm. The liquid level decline in the well at the end of the pumping was 22 feet. The water level decline in the adjacent Extraction Well No. 7 was immediate and equal to that in Well No. 8. This drawdown response indicates that the gravel collector is functioning satisfactorily and has not been plugged with sediment of sludge.

The water level decline in the shallow upgradient Monitoring Well No. 6A was about one foot, indicating that pumping of the extraction wells would lower the level of any leachate that migrates into the compacted earth fill in the vicinity of the Barrier. The decline in the deep adjacent upgradient Monitoring Well No. 6B was immediate and much greater. At the end of the pumping period, the drawdown was 13 feet, which suggests that the injected chemical grout curtain between the well and the gravel collector does not form an effective barrier to the westward lateral migration of leachate. The large drawdown also indicates that the fracture system within the bedrock Puente shale is locally capable of transmitting fluids; but it is perhaps more germane

to note that the extraction wells can effectively control liquid levels within the fracture system.

Liquid level declines in Monitoring Wells 3 and 4 were somewhat anomalous. These two wells are multiple piezometers. Three piezometers are installed in each borehole with staged cement seals to isolate each piezometer. Drawdowns in the piezometers ranged from 1 to 3.5 feet, indicating that pumping of the extraction wells does affect liquid levels in the alluvial fill and fractured shales downgradient from the Barrier. However, subsequent testing of the piezometers revealed that the isolating seals were not effective, and some hydraulic continuity exists between piezometers. (The wells were tested by pumping the deep piezometer and observing level changes in adjacent shallow piezometers) Consequently it was not possible to obtain a precise determination of relative drawdowns.

BARRIER NO. 2

Testing of Barrier No. 2 was conducted during early October using the same procedure employed to test Barrier 1. Extraction Well No. 10 was pumped at a rate of 20 gpm for a period of 36 hours while liquid level changes were measured in the adjacent non-pumping Extraction Well No. 11, and two downgradient Monitoring Well Nos. 14 and 15. All of the wells penetrate the Puente shale, but construction details are not available, and the well structures may be in hydraulic communication with the overlying fill materials.

Drawdown in the pumped Extraction Well 10 was about 20 feet. A comparable drawdown occurred in the adjacent non-pumped Extraction Well No. 11, indicating that the gravel collector is functioning properly. Drawdown in the downgradient Monitoring Wells 14 and 15 was very slow. It continued for several hours after pumping was discontinued and was less than three feet when the test was terminated. Liquid level recovery was very slow in the Extraction Wells. Twenty hours after pumping was discontinued the recovery was less than 1.5 feet. In summary, the test indicates that the Puente shale beneath the Barrier site probably does not contain an extensive fracture system, and that some of the materials surrounding the gravel collector may have become partially sealed with a leachate sludge. In any event, until contrary data is obtained, it seems reasonable to conclude that operation of the Barrier could control the lateral migration of leachate in the vicinity of the Barrier.

DOWNGRADIENT EXTRACTION PLANS

The continuous pumping of an extraction well at each Barrier appears to offer immediate methods of controlling the lateral movement of fluids in the vicinity of the Barriers, and possibly recovering fluids that have migrated downgradient. Continuous pumping would have the effect of creating hydraulic gradients toward the Barrier extraction wells, and thereby prevent the migration of fluids from the landfill in their vicinity. Pumping should be continuous at Barrier 1 and implemented at Barrier 2 as soon as possible. However, there are several

deficiencies at each Barrier that should be addressed within the next two weeks.

1. The existing Monitoring Wells 3 and 4, downgradient from Barrier 1, do not yield reliable information on liquid levels in the alluvial fill and underlying shales.

2. The extent of leachate migration downgradient from the Barriers is unknown.

In order to implement the Downgradient Extraction Plan specified in the DOHS 1SD Amendment XII 1.b, and correct the deficiencies mentioned above, we recommend the following course of action:

1. Construct a shallow 50-foot monitoring well about 150 feet west of the Barrier 1 Extraction Wells to monitor liquid levels in the alluvial fill downgradient from the Barrier.

2. Construct a deep 150-foot monitoring well about 150 feet west of the Barrier 1 Extraction Wells to monitor liquid levels in the Puente shale downgradient from the Barrier.

3. Install an automatic water level recorder at the 150-foot monitoring well described above.

4. Construct shallow and deep monitoring wells, as described in Items 1 and 2 above, about 1,500 feet west of Barrier 1 to monitor the extent of leachate migration from the Barrier.

5. Measure liquid levels in the wells described above and in existing Monitoring Well No. 5 on a weekly basis for 60 days to determine slope of the liquid level surface downgradient from Barrier 1.

6. Construct a shallow and deep monitoring well, as described in Items 1 and 2 above, about 300 feet south of Barrier 2, and measure liquid levels as described in Items 3 and 6 above.

7. Include all new monitoring wells in the liquid sampling program now specified by the Regional Water Quality Control Board.

8. Clean out existing extraction wells, install 6-inch-diameter well screen and gravel filter that will exclude sludge, and install well header assemblies that will facilitate measurement of liquid levels and the collection of liquid samples.

9. Install pumping control systems at Barriers 1 and 2 that are capable of controlling pumping on continuous and cyclical schedules.

10. Install electrical conductivity recorders that are capable of continuously recording the conductivity of liquids pumped from the extraction wells at each Barrier.

11. Enlarge leachate storage facilities with provisions for routinely transporting leachate pumped from the Barriers to the active hazardous liquid waste disposal areas.

Liquid level elevation and electrical conductivity data obtained from the new monitoring wells and conductivity recorders should provide positive evidence on the reliability of the Barriers. The locations of the proposed sites for constructing new monitoring wells are shown on the attached Plate 1. Technical specifications for the wells are presented in the attached Appendix, which also includes specifications for the construction of an upgradient monitoring well. Construction of this well is now in progress.

PROPOSED WORK SCHEDULE

A contract for the construction of the new monitoring wells described herein has been negotiated with Multi Water Systems of Escondido, California. The contractor is now on-site and engaged with the construction of a deep 500-foot upgradient monitoring well. We anticipate that construction of the six monitoring wells downgradient from

Barriers 1 and 2 will commence October 17th and be completed by October 28th.

The measurement of liquid levels at new monitoring wells will commence at the completion of the well construction program. The installation of automatic liquid level recorders will be delayed until December 1st, pending their fabrication and delivery.

Repair and modification of the existing pumping control systems are scheduled for completion by mid-November. However, installation of conductivity recorders may be delayed until early December, pending fabrication and delivery from the factory.

Enlargement of the existing and proposed leachate storage facilities is scheduled for completion by mid-November. This schedule and other work schedules presume a prompt approval of this proposed schedule. An extended delay would accordingly delay completion of the work.

-oOo-

APPENDIX

TECHNICAL SPECIFICATIONS

FOR THE

CONSTRUCTION OF MONITORING WELLS

CONTENTS

Figures

TECHNICAL SPECIFICATIONS

SECTION TS-1

LOCATION AND SCOPE OF WORK

TS-1.00 GENERAL

The specifications presented herein are intended to provide the information necessary for all parties concerned with the work to know the nature and amount of equipment, materials and the work required to successfully construct one monitoring well.

The work shall be carried out in accordance with the following specifications and applicable regulations or requirements adopted by the State of California. All work shall be carried out under the direct supervision of the Owner's representative, LeRoy Crandall and Associates, hereinafter referred to as Consultant.

TS-1.01 LOCATION OF THE WORK

The monitoring wells will be located at the specific sites designated by the Consultant at BKK Sanitary Landfill, West Covina, California. The sites will be located on level ground and be free of any large obstructions that would hinder the work.

TS-1.02 GEOLOGIC CONDITIONS

Subsurface geologic conditions at the proposed drill sites are reasonably well known. The underlying sediments are composed of consolidated siltstone, shale and sandstone of the Miocene Puente Formation. Small amounts of water may be encountered within joints and fractures in these materials.

TS-1.03 SCOPE OF WORK

The work includes furnishing all services, labor, equipment, tools, transportation, and materials for the construction, development and testing of the monitoring wells.

(a) Work related to monitoring well construction shall include:

1. Drilling 12-inch boreholes to depths ranging from 50 to 500 feet.
2. Installing 6-inch PVC well casing and Hydrophilic well screen.
3. Gravel packing.
4. Installing cement surface seals.

(b) Anticipated well casing and screen schedules are summarized in the following table. Depths and lengths are approximate and may be modified by the Consultant.

WELL CASING AND SCREEN SCHEDULE

Monitoring Well Number	Borehole Depth	Casing Length	Screen Length
MW-16	500	400	100
MW-17A	50	30	20
MW-17B	150	100	50
MW-18A	50	30	20
MW-18B	150	100	50

TS-1.04 DRILLING METHODS

All boreholes shall be drilled using the air rotary method. Under no circumstances shall water or foam be introduced into the hole during the drilling operations without the Consultant's approval.

TS-1.05 STERILIZATION OF EQUIPMENT AND MATERIALS

All drilling equipment that will be in direct contact with well casing and other construction materials shall be sterilized by steam cleaning or other appropriate methods, prior to commencing well construction. All construction materials shall be sterilized prior to installation.

TS-1.06 PROTECTION OF PERSONNEL

The contractor is hereby advised that his personnel may be in contact with liquids that could be hazardous to health, and must conform to appropriate OSHA regulations during well construction activities.

SECTION TS-2

MATERIALS AND SERIVCES

TS-2.00 GENERAL

The Owner shall provide all well casing, well screen and gravel. The materials shall be stored in an area not more than two miles from each well site. It shall be the responsibility of the Contractor to transport all materials from the storage area to each drill site.

TS-2.01 WELL CASINGS

(a) The well casing installed in wells less than 300 feet deep shall be six inches in diameter PVC Schedule 40, Type 2 manufactured in accordance with ASTM specification 2120; supplied by Hydrophilic Industries, Inc. The casing shall be joined by male and female flush threaded ends. Schedule 80 PVC casing shall be installed in the 500 foot well. The upper 20 feet of this casing shall be fabricated from 1/4-inch steel plate and threaded at one end for attaching to the PVC casing.

(b) The water level measuring pipe installed in the annulus of the 500 foot well shall be 3/4-inch in diameter PVC Schedule 40. It shall be joined by male and female flush threaded slip ends. The upper 10 feet of the pipe shall be fabricated from 3/4-inch galvanized iron pipe, and threaded at each end for attaching to the PVC pipe and sealing with a cap.

TS-2.02 WELL SCREENS

All well screens shall be supplied by Hydrophilic Industries, Inc. of Puyallup, Washington, telephone (206) 927-4321.

(a) The screen to be installed in wells less than 300 feet deep shall be six inches in diameter PVC Schedule 40, with six rows of 0.040-inch wide slots, with 20 slots per row per foot. Screen sections shall be joined by male and female flush threaded ends. Schedule 80 PVC screen shall be installed in the 500 foot well.

(b) The screen installed in the annulus of the 500 foot well shall be 3/4-inch in diameter PVC Schedule 40, with two rows of 0.040-inch wide slots, with 20 slots per row per foot. Screen sections shall be joined by male and female flush threaded ends.

TS-2.03 GRAVEL PACK MATERIALS

The gravel surrounding the screened interval shall be obtained from the Crystal Silica Company of Oceanside, California and shall consist of clean washed 6-14 silica sand.

TS-2.04 CENTRALIZERS

The Contractor shall provide all centralizers. They shall be fabricated from stainless steel banding stock in accordance with the design shown on Figure 1.

TS-2.05 ANNULUS SEALING MATERIAL

All cement used for sealing shall be standard brand Portland cement conforming to the "Sepcifications for Portland Cement", ASTM Designation C150, Type II. The sealing material shall consist of concrete ground composed of one bag of Portland Cement (94 pounds) and an

equal volume of sand to 5 to 7 gallons of clean water. Quick-setting additives may be used to reduce the setting time.

A five-foot thick seal composed of bentonite pellets shall be placed above gravel envelopes prior to placing cement seals.

SECTION TS-3

MONITORING WELL CONSTRUCTION

TS-3.00 GENERAL PROVISIONS

Boreholes shall be drilled using the conventional air rotary process. The work shall be performed with equipment which is adequate to perform all phases of borehole drilling and well construction. If, in the opinion of the Consultant, the Contractor's equipment is not capable of satisfactorily performing the work provided for in these specifications, the Contractor at his own expense shall substitute equipment satisfactory to the Consultant.

TS-3.01 BOREHOLE DRILLING

(a) The Contractor shall drill the boreholes 12-inches in diameter to depths specified by the Consultant. The Contractor shall take all measures necessary to protect the top portions of the boreholes from caving or raveling, and may find it necessary to install temporary casings.

TS-3.02 GEOPHYSICAL LOGGING

Upon completion of borehole drilling, the Contractor shall prepare the borehole for logging if requested by the Consultant. The type of logging shall be specified by the Consultant.

TS-3.03 INSTALLATION OF CASING AND SCREEN

(a) When the borehole drilling has been completed to the satisfaction of the Consultant, the casing and well screen shall be installed.

The lengths and depths of screen intervals shall be determined by the Consultant.

(b) The casing and screen shall be plumb and centered in the hole. Centralizers, approved by the Consultant, shall be attached to the screen at 20-foot intervals, and to the casing at intervals of 40 feet, in order to center and hold the casing in its proper position until the gravel is in place. The casing shall be suspended in tension from the surface by means of a clamp until the gravel pack has been installed.

(c) If the casing and screen cannot be landed in the correct position, or at a depth acceptable to the Consultant as a consequence of improper well construction practices, the Contractor shall construct another well immediately adjacent to the original location and complete the well in accordance with the specifications at no additional cost to the Owner. The abandoned hole shall be sealed in accordance with County and State requirements.

(d) All work required to be repeated, and all additional materials, labor and equipment required, shall be furnished at the expense of the Contractor and no claim for additional compensation shall be made or be allowed, except as specifically provided herein.

TS-3.04 GRAVEL PACKING

Gravel shall be introduced in such a manner that the volumes are readily known. It shall be placed in a uniform and continuous manner such that segregation and bridging are minimized or eliminated.

SECTION TS-4

COMPLETION OF THE WELLS

TS-4.00 PLACING SURFACE SEALS

Seals placed in the annulus of the wells shall have a minimum thickness of 2 inches and extend from ground surface to a depth specified by the Consultant. Cement shall be placed from the top of the gravel envelopes to ground surface around the entire perimeter of the well casings by the use of a tremie pipe.

TS-4.01 ABANDONED HOLE

(a) If any well fails to conform to these specifications and because of the Contractor's fault he is unable to correct the condition at his own expense, or negotiate a mutually acceptable cost reduction for specification deviations, it shall be considered an abandoned hole, and the Contractor shall immediately start a new well at a nearby location designated by the Consultant.

(b) An abandoned hole shall be treated as follows:

(1) The Contractor may salvage as much casing and screen from the initial well as possible and use it in a new well if not damaged.

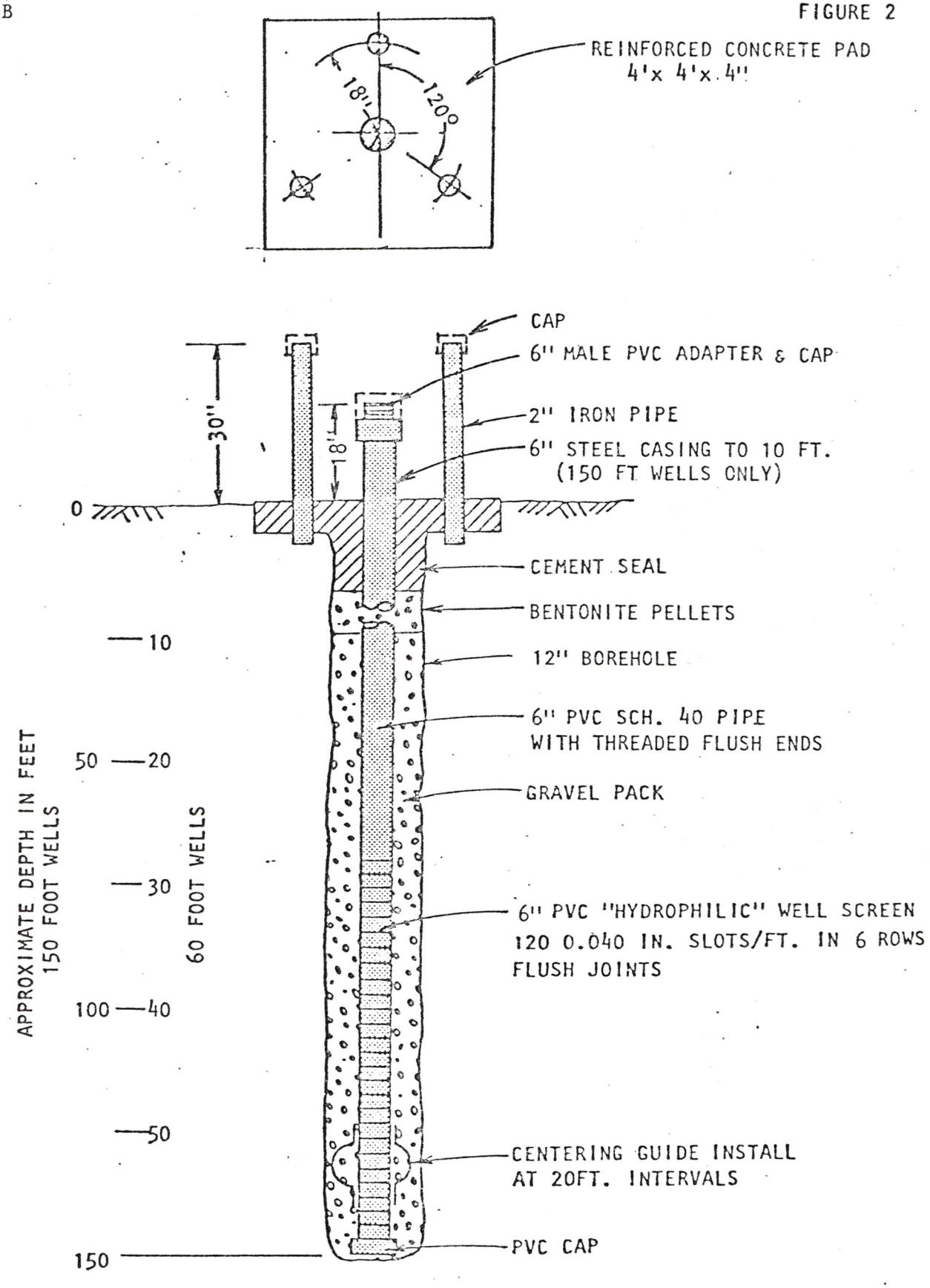
(2) All casing and screen that cannot be salvaged shall be replaced by the Contractor at his own expense.

(3) The hole shall be abandoned in accordance with State and Federal requirements.

(4) Casing remaining in the hole should be cut off at least 5 feet below ground surface. The remaining 5 feet of hole should be filled with native top soil.

(5) No payment will be made for work done on a well that becomes abandoned, or for salvaging materials and sealing the hole.

FIGURE 2



SHALLOW MONITORING WELL CONSTRUCTION DETAILS

WORK SCHEDULE

SITE CHARACTERIZATION AND GROUND WATER MONITORING PROGRAMS

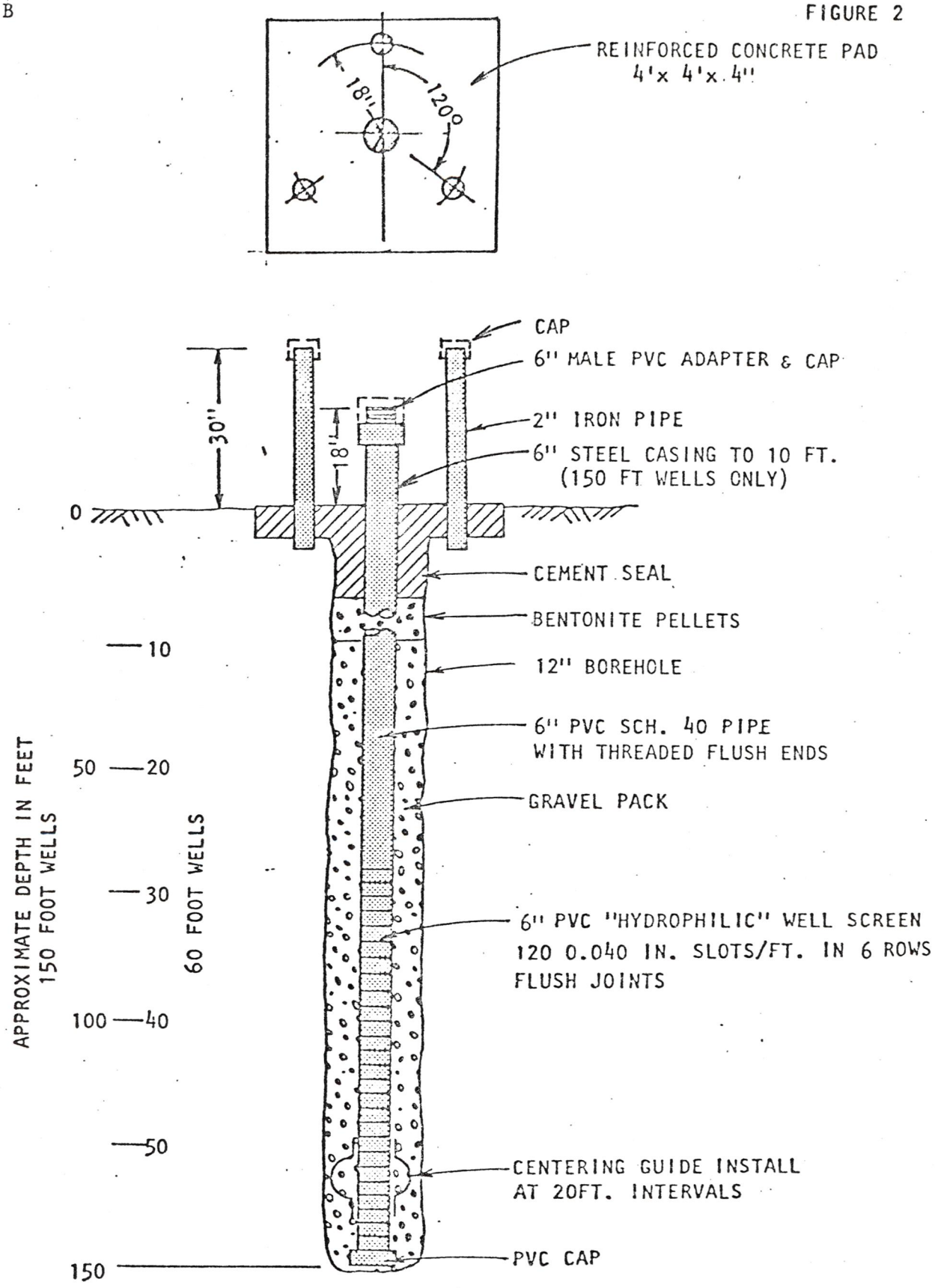
BKK WEST COVINA LANDFILL

Program	November	December	January	February	March
SITE CHARACTERIZATION					
Geologic Mapping	———				
Exploratory Drilling	———	———			
Permeability Testing	———	———			
Report Preparation		———	———		
DOHS REPORT REVIEW					
Review and Conferences			———		
MONITORING WELL CONSTRUCTION					
Material Procurement			—		
Upgradient Wells				———	
Downgradient Wells				———	———

E-83124-B

Figure 3

FIGURE 2

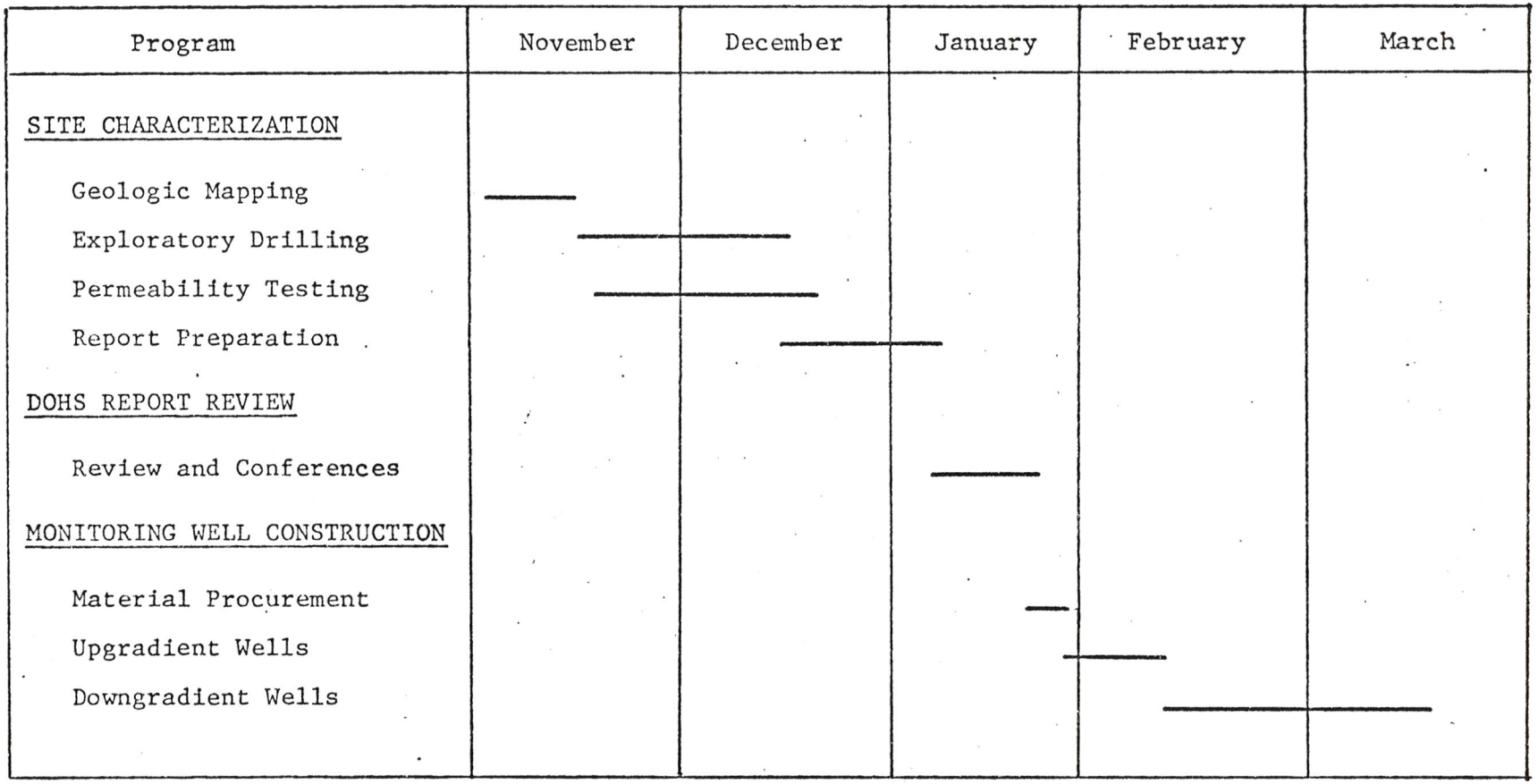


SHALLOW MONITORING WELL CONSTRUCTION DETAILS

WORK SCHEDULE

SITE CHARACTERIZATION AND GROUND WATER MONITORING PROGRAMS

BKK WEST COVINA LANDFILL



E-83124-B

Figure 3

BARRIER AND LINER STUDY PLAN

BKK WEST COVINA SANITARY LANDFILL

Prepared for
BKK Corporation
Torrance, California
November 2, 1983

by
LeRoy Crandall and Associates
Our Job No. E-83124-B

LeROY CRANDALL AND ASSOCIATES consulting geotechnical engineers, 711 n. alvarado st., los angeles, ca. 90026, (213) 413-3550, telex 69-8375

November 2, 1983

Department of Health Services
Toxic Substances Control
107 South Broadway
Los Angeles, California 90012

(Our Job No. E-83124-B)

Attention: Mr. John Hinton
Regional Administrator

Gentlemen:

Interim Status Document No. CAD 067786749
Amended on September 26, 1983
Barrier and Liner Study Plan
BKK West Covina Landfill
West Covina, California

On behalf of the BKK Corporation and in accordance with your Department's Amendment XII-1.C, we are submitting herewith our recommendations for the Barrier and Liner Study. The study addresses Paragraphs (i), (ii), and (iii) of Section C, each of which is described as a separate series of tasks.

We will appreciate receiving your comments as soon as practical.

Yours very truly,

LeROY CRANDALL AND ASSOCIATES

by Glenn A Brown
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB/D49
Attachment
(6 copies submitted)

cc: (2) Regional Water Quality Control Board
Attn: Mr. Hank Yacoub

STUDY PLAN

GENERAL

The hydrogeologic conditions in the vicinity of Barriers 1 and 2 have been previously described in Appendix F of the Part B Application, and to a lesser extent in our Downgradient Extraction Plan dated October 12, 1983. In addition, we have completed the field work relating to pumping tests of Barriers 1 and 2. We are currently analyzing the data obtained. When the analyses are completed, we will be in a position to quantify the amounts of liquids which are able to pass through, under, or around Barriers 1 and 2 under conditions which can be reasonably expected at the Landfill, as requested in Paragraph (i). The general procedures for the testing program have previously been described in our Downgradient Extraction Plan.

Paragraph (ii) requires that the materials used in the construction of Barriers 1 and 2 or those materials that are relied upon as a liner to prevent the downward or lateral migration of hazardous waste constituents are chemically and physically resistant to all those liquids which are reasonably expected to come into contact with those materials. It should be noted that bedrock at this site is considered to be a "liner" by the concerned agencies.

SOIL TESTING

To obtain information on the design and construction of the Barriers, the available reports prepared by Pacific Soils Engineering, Inc. will be studied in detail. Based on the construction details, we

plan to locate the site of four boreholes on each barrier. The borings would be drilled with an 18-inch-diameter bucket auger. Drive samples will be taken of the different materials of those used in the construction of the barrier, with the exception of the gravel. The following tests will be performed on representative soil samples to obtain data on their physical characteristics.

- Soil Classified Per Unified Soil Classification System (ASTM D 2487)
- Soil Gradation (Sieve) Test (ASTM D 422)
- Liquid Limit Test (ASTM D 423)
- Plasticity Index (ASTM D 424)
- Permeability (ASTM D 3385)
- Soluble Sulfate (ASTM D 516-B)
- Soil pH (USDA Handbook 60)

Clay materials will be subjected to x-ray diffraction tests to determine their clay mineral composition. This information will be utilized in determining the susceptibility of the clays to base exchange.

The permeability of a soil is that physical characteristic most likely to be affected by change in the chemical composition of the different types of waste fluids.

To investigate the affect of waste fluid on the permeability of the barrier materials and bedrock, we suggest that the U.S. Bureau of Reclamation, Field Permeability Test Designation E-18 or E-19 be uti-

lized for this purpose. The choice of test will be dependent on field conditions.

Boreholes will be drilled to varying depths within a given type of material, and the test performed with clear water. When clear water baseline data has been obtained, the water will be changed to those fluids obtained in the vicinity of the barriers. The test procedures will be continued until new permeability data is obtained. The results of the tests will be compared to determine if leachate has an effect on the materials. Three such tests are planned on each soil material and bedrock at each barrier.

PERMEABILITY

Paragraph (iii) requires the determination of numerical permeability and attenuation characteristics of each of the materials used in the construction of Barriers 1 and 2 and the liner. Permeability data will be derived from the tasks described under Paragraphs (i) and (ii). Both laboratory and in situ tests will be performed and reported upon.

ATTENUATION

The attenuation of constituents of waste fluids will be investigated through the use of soil percolation columns. We suggest that glass columns approximately four feet in length and three inches in diameter be filled with representative soils of each type of materials used in the construction of the barriers and bedrock. In order to obtain sufficient numbers of tests to be representative, we suggest using five columns per each soil type at each barrier. The glass

columns will be filled with materials passing a Number 40 U.S. Standard Sieve, and tamped until relatively firm to minimize any channelizing between the sample and the glass column.

One of the columns of each set will be used for the percolation of distilled water, the other four will use leachate obtained from the respective barrier as the test fluid. The columns will be enclosed and the original fluid will be recycled through the column for a period of 15 to 30 days. Detailed chemical analyses will be made of the fluids before the commencement of the percolation and after the completion of the recycling operations. Comparisons will be made between the two sets of analyses for each soil column. Any increase or decrease in solute concentrations can be identified by this process.

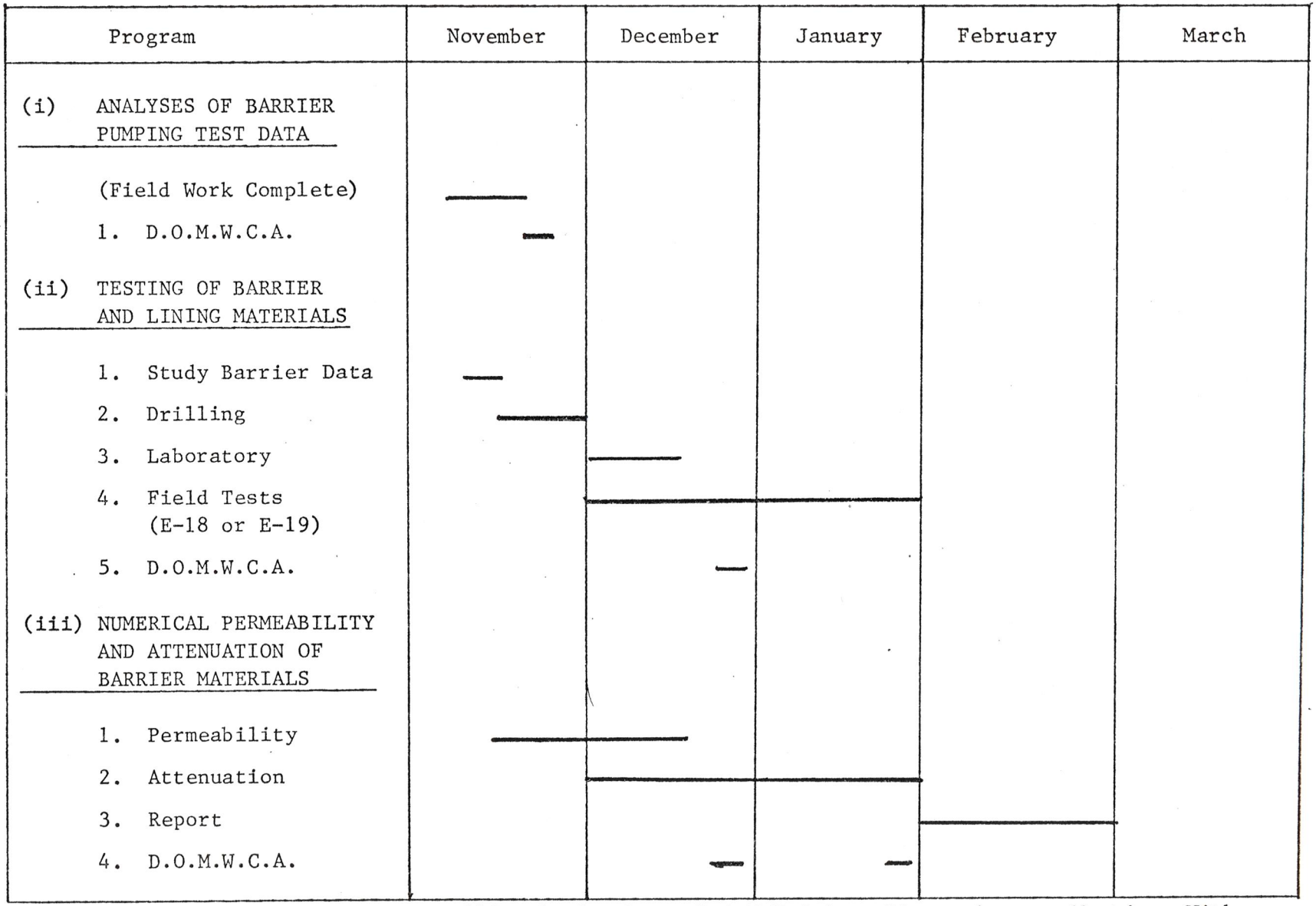
The results of the soil percolation testing will be presented in the formal report which will be prepared at the conclusion of the studies.

WORK SCHEDULE

The attached Figure 1 presents our estimated work schedule. We will commence the outlined tasks upon approval of our study plan by DOHS. It appears reasonable that the work can be completed within the 120 calendar days specified. However, we are entering the rainy season, and the possibility of delays caused by the weather may be anticipated.

-oOo-

WORK SCHEDULE
BARRIER AND LINER STUDY
BKK WEST COVINA LANDFILL



NOTE: Tests to be completed within 120 calendar days, D.O.M.W.C.A. = Discussions or Meetings With Concerned Agencies.

LIQUID MANAGEMENT PLAN

BKK WEST COVINA SANITARY LANDFILL

Prepared for
BKK Corporation
Torrance, California
November 15, 1983

by
LeRoy Crandall and Associates
Our Job No. E-83124-B

LeROY CRANDALL AND ASSOCIATES consulting geotechnical engineers, 711 n. alvarado st., los angeles, ca. 90026, (213) 413-3550, telex 69-8375

November 15, 1983

Department of Health Services
Toxic Substances Control
107 South Broadway
Los Angeles, California 90012

(Our Job No. E-83124-B)

Attention: Mr. John Hinton
Regional Administrator

Gentlemen:

Interim Status Document No. CAD067786749
Amended on September 26, 1983
Liquid Management Plan
BKK West Covina Landfill
West Covina, California

In accordance with your Department's Amendment XII.1d we are submitting herewith our recommendations for a Liquid Management Plan. The Plan addresses Paragraphs (i), (ii), and (iii) of Section D.

Due to the requirements of the plan to include information on the nature and extent of fracture zones and permeabilities of materials; the work schedule will reflect a delay until those data are developed from the Barrier and Liner Study and from the Site Characterization and Groundwater Monitoring Program.

We will appreciate receiving your comments as soon as practical.

Yours very truly,

LeROY CRANDALL AND ASSOCIATES

by Glenn A Brown
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB/pg
(6 copies submitted)

cc: (2) Regional Water Quality Control Board
Attn: Mr. Hank Yacoub

LIQUID MANAGEMENT PLAN

The liquid management plan will be undertaken to develop a better understanding of the past liquid waste disposal practice at the site and to make projections for thirty years into the future. Paragraph d (i) requires the development of a "water balance". This requirement will be met by using the water balance method set forth by the EPA.

The method will be modified to consider the nature and extent of fractured zones, permeability of the various materials, and the effect of grading operations on evapotranspiration. The water balance will include evaluation of fluids derived from the deep percolation of rainfall, impoundments, soil saturation, springs and vapor transport by the gas recovery system.

Information on the nature and extent of the fractured zones will be developed during the first and second months of the Site Characterization Program. The permeability of the materials present on the site will be studied and reported upon under the Site Characterization Program and during the Barrier and Liner Study.

The effects of grading operations on evapotranspiration will be evaluated by taking the areas of graded portions and trash from a series of aerial photographs dated 1968, 1975 and 1982. The differences in evapotranspiration will be determined through the use of Los Angeles County Flood Control Hydrology Manual and Blaney Criddle Methodology.

Paragraph d (ii) requires a schedule of work and the proposed liquid management program to collect and remove all leachate from the

facility. We propose to evaluate the various alternatives for disposal of any leachate. Such alternatives include:

1. On-site treatment and sewering the effluent.
2. Recycling the leachate or residue into dry portions of the site.
3. Incineration.
4. A possible combination of any of the above.

The levels of liquids in the landfill will be explored by the construction of approximately 5 monitoring points within the area underlain by considerable thicknesses of trash. The locations when selected will be approved by DOHS, prior to construction.

When and if excessive levels of leachate are determined to exist within the landfill, a program to remove such leachate will be embarked upon with the approval of DOHS.

Paragraph d (iii) requires the preparation of a report which evaluates and predicts the effect of the liquid management plan. We will prepare such a report which will include the results of the water balance and the results of operational data attained from Barriers 1 and 2.

A time schedule will be prepared when the due dates of the other required plans are better established.

-oOo-

That portion of the Rancho La Puente in the City of West Covina known as Lot 3 as shown on record of survey recorded in Book 85, Page 10, on file in the Office of the County Recorder, County of Los Angeles, State of California is subject to the terms and conditions contained in City of West Covina Unclassified Use Permit No. 71 Revision 5 as adopted by City Council Resolutions No. 4919, 5040, and 5211 on July 14, 1976, and subsequent amendments which permitted use of the property, as a waste disposal site.

The owner of the property described herein BKK CORPORATION will be held responsible for the perpetual maintenance of this waste disposal site and incur the associated financial obligations contained in Unclassified Use Permit No. 71 Revision 5 subsequent amendments.

Current and subsequent owners of the property described herein forever agree to hold the City of West Covina free and clear of any and all responsibility for the maintenance of, or activities on the waste disposal site.

DATED: August 31, 1978.

BKK CORPORATION

By Ben K. Kaiarian Jr

By Ernest T. Winter

Owner

STATE OF CALIFORNIA
COUNTY OF Los Angeles } ss
On August 31, 1978 before me, the undersigned a Notary Public in and for said County and State personally appeared BEN K. KAIARIAN, JR. known to me to be the President, and ERNEST T. WINTER known to me to be Secretary of the corporation that executed the within instrument known to me to be the persons who executed the within instrument on behalf of the corporation therein named and acknowledged to me that such corporation executed the within instrument pursuant to its by-laws or a resolution of its board of directors.

Signature Lynn Meyerson

FOR NOTARY SEAL OR STAMP

OFFICIAL SEAL
LYNN MEYERSON
NOTARY PUBLIC - CALIFORNIA
PRINCIPAL OFFICE IN
LOS ANGELES COUNTY
My Commission Expires Aug 31, 1981

Sections 3004 and 3005 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 9176, as amended.

Legal Description: That portion of the Rancho La Puente in the City of West Covina, County of Los Angeles, State of California, known as Lot 3 as shown on Record of Survey recorded in Book 85, Pages 10 through 12 inclusive, on file in the Office of the County Reocrder of said County, described as follows:

Beginning at the southeasterly terminus of that certain course in the boundary of said Lot 3, shown as having a bearing of North 55° 00' 45" West and a length of 1911.13 feet, on said Record of Survey, said certain course having a bearing of North 55° 14' 38" West for the purposes of this description; thence North 9° 16' 48" West 1244.18 feet to the True Point of Beginning, thence along the following courses and distances:

North 33° 44' 32" East 186.39 feet; South 50° 54' 22" East 214.84 feet;
North 73° 04' 21" East 240.42 feet; North 2° 29' 22" West 460.43 feet;
North 33° 41' 24" East 649.00 feet; North 49° 14' 11" East 382.88 feet;
North 59° 55' 53" East 439.09 feet; South 73° 18' 03" East 208.81 feet;
North 75° 10' 25" East 351.71 feet; North 84° 38' 39" East 642.81 feet;
South 15° 31' 27" West 186.82 feet; South 26° 33' 54" East 201.25 feet;
North 66° 30' 05" East 501.60 feet; South 36° 52' 12" East 100.00 feet;
South 57° 31' 44" West 130.38 feet; South 21° 48' 05" East 161.55 feet;
South 77° 00' 19" East 133.42 feet; South 12° 12' 02" East 378.55 feet;
South 60° 15' 18" East 161.25 feet; North 83° 09' 26" East 251.79 feet;
North 60° 31' 27" East 264.20 feet; South 7° 23' 10" East 544.52 feet;
South 60° 29' 57" West 1746.42 feet; South 28° 14' 15" West 612.94 feet;
North 86° 03' 17" West 290.69 feet; North 36° 09' 29" West 322.02 feet;
North 72° 53' 50" West 272.03 feet; South 75° 57' 50" West 346.34 feet;
South 88° 20' 52" West 312.13 feet; North 47° 08' 35" West 548.39 feet;
North 55° 22' 33" West 510.39 feet; North 29° 44' 42" West 161.80 feet;
more or less, to the True Point of Beginning.

Address: 2210 South Azusa Avenue, West Covina, California.

DATED:_____ BKK CORPORATION

BY_____

BY_____
Owner

STATE OF CALIFORNIA)
ss
COUNTY OF LOS ANGELES)

On_____ before me
the undersigned a Notary Public
in and for said County and State,
personally appeared_____
known to me to be the_____ President and
_____ known to me to be the
_____ Secretary of the corporation
that executed the within instrument on behalf of the
corporation therein named, and acknowledged to me
that such corporation executed the within instrument
pursuant to its by-laws or a resolution of its board
of directors.

Signature_____
Sanford J. Cohen, Notary Public